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454-66

AU 344

46208

GB 0904052

AUG 1962

904052

PROVISIONAL SPECIFICATION

SHEETS

*This drawing is a reproduction of
the Original on a reduced scale
Sheets 1 & 2*

FIG. 3.

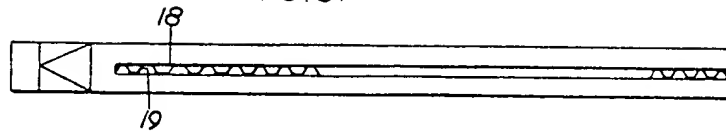
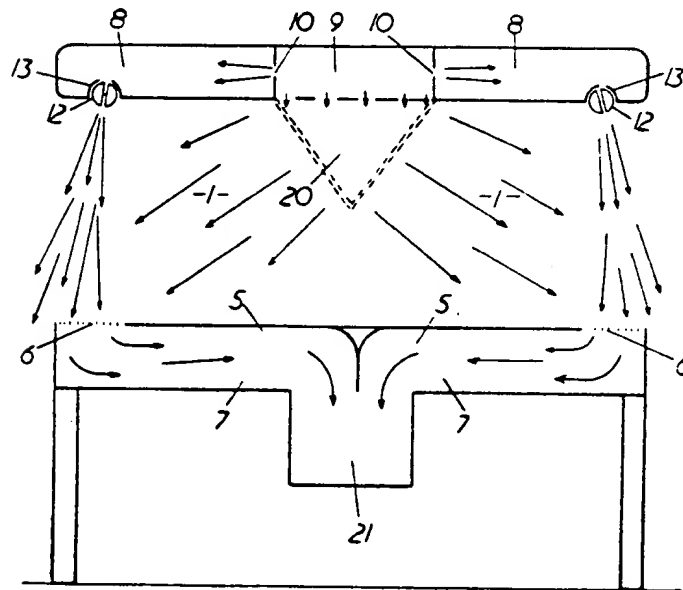
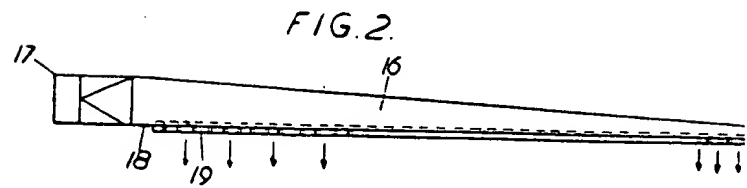
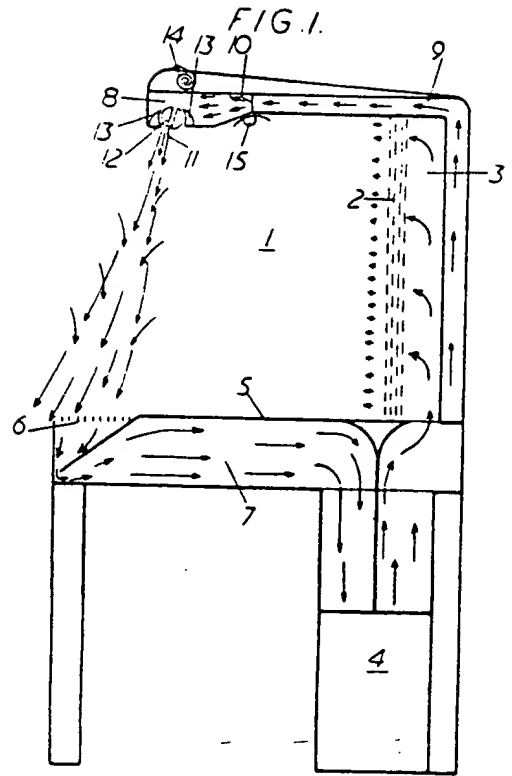


FIG. 4.



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PATENT SPECIFICATION

DRAWINGS ATTACHED

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DIV. 380

COMPLETE SPECIFICATION

**Improvements relating to Methods and Apparatus for
Maintaining an Atmosphere having Predetermined
Characteristics in an Open-fronted Chamber**

We, CARRIER ENGINEERING COMPANY LIMITED, a Company incorporated under the laws of Great Britain, of 24, Buckingham Gate, London, S.W.1, England, do hereby
5 declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to methods and apparatus for maintaining an atmosphere having predetermined characteristics in an open-sided chamber, and in particular to methods and apparatus for maintaining a dust-free atmosphere in an open-sided work
15 cabinet, for example in the manufacture of delicate control mechanisms or radio components, for example transistors, or in the packing of pharmaceuticals, for example penicillin.
20

There are at least two types of work cabinet at present in use in which a required atmosphere is maintained by wholly or partially restricting free access to the goods.
25 In the first type the operative is required to work via gloves sealed in the cabinet wall, and in the second type through a restricted opening immediately above the working table, through which atmosphere from the chamber
30 is continually expelled.

It is a main object of the present invention to maintain an atmosphere having predetermined characteristics in an open-sided chamber which allows virtually unrestricted
35 access to the interior of the chamber, by an operator outside it.

According to the invention there is provided a method of maintaining an atmosphere having predetermined characteristics in a
40 chamber having an open side, the prescribed

atmosphere being admitted into the chamber so as to be circulated through the chamber and find exit near the open side, the characteristic of the atmosphere in the chamber being retained by continually extracting the atmosphere at the open side, imparting the desired characteristics to the atmosphere withdrawn, returning the reconstituted atmosphere into circulation through the chamber and directing the circulating atmosphere to the exit from the chamber by maintaining a curtain of atmosphere across the open side and towards the exit moving at a velocity and of such a thickness as to permit an operator's arm to be extended through the curtain without
45 either allowing the circulating atmosphere to escape from the chamber through the curtain or creating streams of curtain air inwardly into the chamber.
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Where the chamber has two open sides the prescribed atmosphere may be admitted into the chamber so as to create two oppositely circulating volumes of the desired atmosphere, each moving towards an open side, each volume being extracted at the respective open side, and the escape of the atmosphere through the respective open side may be prevented by maintaining a curtain of atmosphere moving at a predetermined velocity and of a predetermined thickness across each open side.
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The reconstituted atmosphere may be admitted through a diffusing partition so that the circulating atmosphere moves between the partition and the open side at which the exit for the admitted atmosphere is located.
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The invention also comprehends a method of maintaining an atmosphere having predetermined characteristics in a chamber having
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[Price 4s. 6d.]

an open front, the prescribed atmosphere being admitted into the chamber near the back thereof the characteristics of the atmosphere circulated through the chamber being retained by continually withdrawing at the front of the chamber atmosphere admitted to the chamber, imparting the desired characteristics to the atmosphere withdrawn, returning the reconstituted atmosphere through the back of the chamber and directing the out-flow of the atmosphere circulating through the chamber to the area of withdrawal by maintaining a curtain of atmosphere across the front of the chamber and towards the area of withdrawal at a velocity and of such a thickness as to permit an operators' arm to be extended through the curtain without either allowing exit of atmosphere circulating through the chamber otherwise than in the region of the area of withdrawal or creating inwardly directed streams of curtain atmosphere into the chamber.

The invention also provides a controlled-atmosphere cabinet comprising a chamber having an open side, means located in the chamber for admitting a prescribed atmosphere into the chamber so as to be circulated therethrough, an extract for the atmosphere at the front of the chamber, means for recirculating extracted atmosphere and reconstituting the said predetermined characteristics before it is returned to the chamber, and an atmosphere outlet along the top of the open side operable to form a curtain of atmosphere extending downwardly across the open side.

The back of the chamber may be formed as a diffusing partition through which the atmosphere is admitted.

Further according to the invention a controlled-atmosphere cabinet may comprise a chamber having two opposite sides open, means located in the chamber between the open sides for admitting the atmosphere so as to create two oppositely circulating volumes each moving towards an open side, an extract for the atmosphere at each of the open sides, means for re-circulating the extracted atmosphere and reconstituting the said predetermined characteristics before it is returned to the chamber, and an atmosphere outlet along the top of each open side operable to form a curtain of atmosphere extending downwardly across each open side.

The chamber may be divided into two parts by a centrally disposed diffusing partition connected to the atmosphere-reconstituting means and through which atmosphere is admitted to both parts of the chamber, there being an aperture and co-operating flap in said partition to allow passage of articles from one part of the chamber to the other.

In another construction according to the invention the means for admitting the pres-

cribed atmosphere may comprise atmosphere-diffusing means centrally located at or near the top and bottom of the chamber and connected to the atmosphere-reconstituting means.

A number of controlled-atmosphere cabinets according to the invention may be arranged in side-by-side relation to form a controlled-atmosphere cabinet system wherein the intermediate walls between the chambers each have an aperture for the passage of a conveyor and a flap for the aperture to permit a load on the conveyor to pass from one chamber to the next.

In order that the invention may be clearly understood some embodiments thereof will now be described, by way of example, with reference to the diagrammatic drawings accompanying the provisional specification, in which:—

Figure 1 is a section through an open sided chamber according to the invention,

Figure 2 is a plan view of the curtain header duct.

Figure 3 is a front elevation of the duct of Figure 2, and

Figure 4 is a section through a chamber according to the invention having two open sides.

In the drawings the same reference numbers indicate the same or similar parts.

Referring to Figure 1 of the drawings an atmosphere having predetermined characteristics is maintained in a chamber 1 having an open front side which has mounted therein a diffusing partition wall 2 formed, for example, of flat sheets of fibreglass through which the prescribed atmosphere is introduced in to the chamber 1 by a supply duct 3 which extends to the back of the diffusing wall 2 from an atmosphere-reconstituting unit 4. The floor of the chamber 1 is partly a working surface 5, for the operator, and between the working surface 5 and the front of the chamber is an extract grill 6 which is connected by an extract duct 7 extending under the working surface 5 to the atmosphere-reconstituting unit 4.

A curtain of atmosphere provided in front of the cabinet in accordance with the invention is produced from the top of the front of the chamber 1 and is arranged so that a volume of the curtain atmosphere on the inside of the curtain passes into the extract duct 7 with the atmosphere being withdrawn from the chamber.

The cabinet 1 has a false ceiling which forms a pressure chamber 8 supplied by a conduit 9 connected to the atmosphere-reconstituting unit 4. The conduit 9 is connected to the chamber 8 by a distributive resistance slot 10 so that uniform pressure is maintained in the chamber 8. Atmosphere is discharged from the chamber 8 to form

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the curtain through an atmosphere outlet shown as a slot 11 in a curtain header 12, and there is uniform distribution of the atmosphere along the length of the slot 11.

5 The curtain header 12 is rotatably mounted in rubber sealing members 13 in an aperture in the floor of the chamber 8 extending along the front of the cabinet.

10 A roller night curtain 14 for excluding dust from the chamber when the atmosphere curtain is not in operation, and a strip light 15 for illuminating the interior of the chamber, are disposed in the vicinity of the pressure chamber 8.

15 If it is desired to supply curtain atmosphere from an inlet at one side of the cabinet a curtain header duct as shown in Figures 2 and 3 is used to obtain uniform pressure distribution along the front of the cabinet. 20 The header duct 16 tapers away from the supply end 17 and has a longitudinal slot 18 in which are mounted flow straightening vanes 19 so that the curtain atmosphere is discharged at right angles to the length of the slot 18.

25 When carrying out operations in the cabinet there is continual withdrawal through the extract grill 6 of atmosphere admitted into the chamber 1 through the diffusing wall 2. 30 The atmosphere withdrawn is filtered in the atmosphere-reconstituting unit 4 and the resulting reconstituted atmosphere is returned through the supply duct 3 to give a back-to-front flow which is substantially uniform throughout the chamber.

35 This back-to-front flow of atmosphere would itself provide a considerable degree of protection against the penetration of dust into the chamber, but the conditioned 40 atmosphere would be wasted when it left the chamber. The principal protection against the entry of dust carried by draughts outside the chamber is the curtain of atmosphere. This curtain of atmosphere also 45 directs the out-flow of the atmosphere in the chamber to the extract grill, and is maintained at a velocity and of such a thickness to permit an operator's arms to be extended through the open front side of the chamber without allowing either exit of atmosphere 50 otherwise than in the region of the extract grill or creating inwardly directed streams of curtain atmosphere.

55 The curtain of atmosphere entrains contaminated air from outside the chamber after only a short path of travel, and also becomes mixed with atmosphere flowing to the open side of the chamber. The extracted atmosphere is thus contaminated with some of the air from outside the chamber. Also 60 spillage which goes to waste in front of the extract grill 6 includes some of the atmosphere of the chamber. The curtain header 12 is conveniently positioned so that the curtain 65 of atmosphere is directed at a small forward

angle to the vertical as indicated in Figure 1, at which position the major part of the curtain volume passes into the extract duct 7.

Experimental determinations have shown 70 that by balancing the quantity of atmosphere admitted through the back of the chamber, the quantity of atmosphere extracted at the front of the chamber and the supply of the curtain of atmosphere it is possible to obtain 75 the desired atmosphere in the chamber with considerable economy in the application of the air treatment unit, this being because 75-80% of the atmosphere introduced through the diffusing wall 2 is recirculated, 80 and filter capacity and heating, cooling or humidifying capacity effected by the atmosphere-reconstituting unit 4 is only that required to clean the 25-20% of contaminated air entrained by the curtain. 85

It has been found possible to obtain virtually complete protection against the penetration of airborne dust into the chamber, at least 95% efficiency in this respect being 90 attainable.

Thus the invention allows the maintenance of an atmosphere having predetermining characteristics in a chamber without imposing on an operator the need to manipulate components and assemblies through a restricted 95 access space.

A further embodiment of the invention is illustrated in Figure 4 of the drawings which shows a cabinet including a chamber 100 1 with two opposite sides open. Atmosphere is admitted into the chamber through a V-section duct 20 of diffusing material, for example fibre-glass, fixed to the top of the chamber between the open sides.

The shape of the duct 20 is such that 105 it creates two oppositely circulating volumes of atmosphere each moving, as indicated by the arrows, towards an open side of the chamber 1.

The duct 20 communicates with a supply 110 conduit 9 which runs along the top of the cabinet and is connected to the atmosphere-reconstituting unit, not shown, and the conduit 9 also feeds pressure chambers 8, one for each open side, through distributive 115 resistance slots 10. Each of the pressure chambers 8 discharges atmosphere through an atmosphere inlet of the same kind as illustrated in Figure 1 so that a curtain of atmosphere is formed across each open side 120 of the chamber 1.

An extract grill 6 is provided at the front of each open side and the extract ducts 7 for the two sides are connected together by a common duct 21 which is 125 connected to the atmosphere-reconstituting unit.

In another embodiment of the invention the chamber 1 is divided into two parts 130 by a centrally disposed diffusing partition

connected to the atmosphere reconstituting means and through which atmosphere is admitted to both parts of the chamber, there being an aperture and co-operating flap in the partition to allow articles to be passed from an operator working through one of the open sides to an operator working through the other open side.

A number of single-sided or double-sided cabinets can if desired be constructed in unit lengths which can be coupled together to give either continuous work benches or individual assembly tables. The supplied atmosphere may be fed by a group plant serving a number of cabinets or from individual units integral with each cabinet. Where the individual assembly tables are separated by intermediate walls, each of these walls may have an aperture for the passage of a conveyor through the units, and a flap for the aperture to permit a load on the conveyor to pass from one chamber to the next.

It will be understood that in certain circumstances curtain atmosphere may be supplied from a different source and not from the atmosphere-reconstituting unit 4. For example when handling a very light commodity such as a powder it is advantageous to have a low rate of flow through the diffusing wall 2 while maintaining the supply of the curtain of atmosphere already described.

WHAT WE CLAIM IS:—

1. A method of maintaining an atmosphere having predetermined characteristics in a chamber having an open side, the prescribed atmosphere being admitted into the chamber so as to be circulated through the chamber and find exit near the open side, the characteristics of the atmosphere in the chamber being retained by continually extracting the atmosphere at the open side, imparting the desired characteristics to the atmosphere withdrawn, returning the reconstituted atmosphere into circulation through the chamber and directing the circulating atmosphere to the exit from the chamber by maintaining a curtain of atmosphere across the open side and towards the exit moving at a velocity and of such a thickness as to permit an operator's arm to be extended through the curtain without either allowing the circulating atmosphere to escape from the chamber through the curtain or creating streams of curtain air inwardly into the chamber.

2. A method of maintaining an atmosphere having predetermined characteristics in a chamber according to Claim 1, wherein the chamber has two open sides, in which method the prescribed atmosphere is admitted into the chamber so as to create two oppositely circulating volumes of the desired atmosphere, each moving towards an open side, each volume being extracted at the respective open

side, and the escape of the atmosphere through the respective open side is prevented by maintaining a curtain of atmosphere moving at a predetermined velocity and of a predetermined thickness across each open side.

3. A method of maintaining an atmosphere having predetermined characteristics in a chamber having an open side according to Claim 1 or 2, wherein the reconstituted atmosphere is admitted through a diffusing partition so that the circulating atmosphere moves between the partition and the open side at which the exit for the admitted atmosphere is located.

4. A method of maintaining an atmosphere having predetermined characteristics in a chamber having an open front, the prescribed atmosphere being admitted into the chamber near the back thereof the characteristics of the atmosphere circulated through the chamber being retained by continually withdrawing at the front of the chamber atmosphere admitted to the chamber, imparting the desired characteristics to the atmosphere withdrawn, returning the reconstituted atmosphere through the back of the chamber and directing the out-flow of the atmosphere circulating through the chamber to the area of withdrawal by maintaining a curtain of atmosphere across the front of the chamber and towards the area of withdrawal at a velocity and of such a thickness as to permit an operator's arm to be extended through the curtain without either allowing exit of atmosphere circulating through the chamber otherwise than in the region of the area of withdrawal or creating inwardly directed streams of curtain atmosphere into the chamber.

5. A controlled-atmosphere cabinet comprising a chamber having an open side, means located in the chamber for admitting a prescribed atmosphere into the chamber so as to be circulated therethrough, an extract for the atmosphere at the front of the chamber, means for recirculating extracted atmosphere and reconstituting the said predetermined characteristics before it is returned to the chamber, and an atmosphere outlet along the top of the open side operable to form a curtain of atmosphere extending downwardly across the open side.

6. A controlled-atmosphere cabinet according to Claim 5, wherein the back of the chamber is formed as a diffusing partition through which the atmosphere is admitted.

7. A controlled-atmosphere cabinet according to Claim 5, comprising a chamber having two opposite sides open, means located in the chamber between the open sides for admitting the atmosphere so as to create two oppositely circulating volumes each moving towards an open side, an extract for the atmosphere at each of the open sides, means

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for re-circulating the extracted atmosphere and reconstituting the said predetermined characteristics before it is returned to the chamber, and an atmosphere outlet along the top of each open side operable to form a curtain of atmosphere extending downwardly across each open side.

8. A controlled-atmosphere cabinet according to Claim 7, wherein the chamber is divided into two parts by a centrally disposed diffusing partition connected to the atmosphere reconstituting means and through which atmosphere is admitted to both parts of the chamber, there being an aperture and co-operating flap in said partition to allow passage of particles from one part of the chamber to the other.

9. A controlled-atmosphere cabinet according to Claim 7, wherein the means for admitting the prescribed atmosphere comprises atmosphere-diffusing means centrally located at or near the top and bottom of the chamber and connected to the atmosphere-reconstituting means.

10. A controlled-atmosphere cabinet system comprising a number of controlled-atmosphere cabinets according to any of the preceding Claims 5 to 9 arranged in side-by-side relation, wherein the intermediate walls between the chambers each have an aperture for the passage of a conveyor and a flap for the aperture to permit a load on the conveyor to pass from one chamber to the next.

11. A method of maintaining an atmosphere having predetermined characteristics in a chamber having an open side, substantially as herein described.

12. A controlled-atmosphere cabinet constructed and arranged to operate substantially as herein described with reference to Figures 1 to 3 or Figures 2 to 4 of the drawings accompanying the provisional specification.

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PROVISIONAL SPECIFICATION

Improvements relating to Methods and Apparatus for Maintaining an Atmosphere having Predetermined Characteristics in an Open-fronted Chamber

We, CARRIER ENGINEERING COMPANY LIMITED, a Company incorporated under the laws of Great Britain, of 24, Buckingham Gate, London, S.W.1, England, do hereby declare this invention to be described in the following statement:—

This invention relates to methods and apparatus for maintaining an atmosphere having predetermined characteristics in an open-sided chamber, and in particular to methods and apparatus for maintaining a dust-free atmosphere in an open-sided work cabinet, for example in the manufacture of delicate control mechanisms or radio components, for example transistors, or in the packing of pharmaceuticals, for example penicillin.

There are at least two types of work cabinet at present in use in which a required atmosphere is maintained by wholly or partially restricting free access to the goods. In the first type the operative is required to work via gloves sealed in the cabinet wall, and in the second type through a restricted opening immediately above the working table, through which atmosphere from the chamber is continually expelled.

It is a main object of the present invention to maintain an atmosphere having predetermined characteristics in an open-sided chamber which allows virtually unrestricted access to the interior of the chamber, by an operator outside it.

According to the invention there is pro-

vided a method of maintaining an atmosphere having predetermined characteristics in a chamber having an open side, the prescribed atmosphere being admitted into the chamber so as to be circulated therein and find exit near the open side, the characteristic of the atmosphere in the chamber being retained by continually extracting the atmosphere at the open side, imparting the desired characteristics to the atmosphere withdrawn, returning the reconstituted atmosphere into circulation in the chamber and directing the circulating atmosphere to the exit from the chamber by maintaining a curtain of atmosphere across the open side and towards the exit moving at a velocity and of such thickness to permit an operator's arm to be extended through the open side without either allowing the circulating atmosphere to escape through the open side or creating streams of curtain air inwardly of the chamber.

Where the chamber has two open sides the prescribed atmosphere may be admitted into the chamber so as to create two oppositely circulating volumes of the desired atmosphere, each moving towards an open side, each volume being extracted at the respective open side, and the escape of the atmosphere through the respective open side may be prevented by maintaining an atmosphere curtain of the desired velocity and thickness across each open side.

The reconstituted atmosphere may be admitted through a diffusing partition so

that the circulating atmosphere moves between the partition and the open side at which the exit for the admitted atmosphere is located.

5 The invention also comprehends a method of maintaining an atmosphere having pre-determined characteristics in a chamber having an open front, the prescribed atmosphere being admitted into the chamber near
10 the back thereof the characteristics of the atmosphere in the chamber being retained by continually withdrawing at the front of the chamber atmosphere admitted to the chamber imparting the desired characteristics to the
15 atmosphere withdrawn, returning the reconstituted atmosphere through the back of the chamber and directing the out-flow of the atmosphere in the chamber to the area of withdrawal by maintaining an atmosphere
20 curtain across the front of the chamber and towards the area of withdrawal at a velocity and thickness to permit an operator's arm to be extended through the open front of the chamber without either allowing exit of
25 atmosphere otherwise than in the region of the area of withdrawal or creating inwardly directed streams of curtain atmosphere.

The invention also provides a controlled-atmosphere cabinet comprising a chamber
30 having an open side, means located in the chamber for admitting a prescribed atmosphere into the chamber so as to be circulated therein, an extract for the atmosphere at the front of the chamber, means for recirculating the extracted atmosphere and reconstituting
35 the said predetermined characteristics before it is returned to the chamber, and an atmosphere inlet at the top of the open side disposed to form an atmosphere curtain across the open side.
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The back of the chamber may be formed as a diffusing partition through which the atmosphere is admitted.

45 Further according to the invention a controlled atmosphere cabinet may comprise a chamber having two opposite sides open, means located in the chamber between the open sides for admitting the atmosphere so as to create two oppositely circulating volumes
50 each moving towards an open side, an extract for the atmosphere at each of the open sides, means for re-circulating the extracted atmosphere and reconstituting the said predetermined characteristics before it is
55 returned to the chamber, and an atmosphere inlet at the top of each open side disposed to form an atmosphere curtain across each open side.

60 The chamber may be divided into two parts by a centrally disposed diffusing partition connected to the atmosphere reconstituting means and through which atmosphere is admitted to both parts of the chamber, there being an aperture and co-operating flap in

said partition to allow passage of articles 65 from one part of the chamber to the other.

In another construction according to the invention the means for admitting the prescribed atmosphere may comprise atmosphere
70 diffusing means centrally located at or near the top and bottom of the chamber and connected to the atmosphere reconstituting means.

A number of controlled atmosphere cabinets according to the invention may be
75 arranged in side-by-side relation to form a controlled atmosphere cabinet system wherein the intermediate walls between the chambers each have an aperture for the passage of a conveyor and a flap for the
80 aperture to permit a load on the conveyor to pass from one chamber to the next.

In order that the invention may be clearly understood some embodiments thereof will now be described by way of example, with
85 reference to the accompanying diagrammatic drawings, in which:—

Figure 1 is a section through an open sided chamber according to the invention,

Figure 2 is a plan view of a curtain 90 header duct,

Figure 3 is a front elevation of the duct of Figure 2, and

Figure 4 is a section through a chamber according to the invention having two open 95 sides.

In the drawings the same reference numbers indicate the same or similar parts.

Referring to Figure 1 of the drawings an atmosphere having predetermined characteristics 100 is maintained in a chamber 1 having an open front side which has mounted therein a diffusing partition wall 2 formed, for example, of flat sheets of fibreglass through which the prescribed atmosphere is introduced
105 in to the chamber 1 by a supply duct 3 which extends to the back of the diffusing wall 2 from an atmosphere reconstituting unit 4. The floor of the chamber 1 is partly a working surface 5, for the operator, and between the working surface 5
110 and the front of the chamber is an extract grill 6 which is connected by an extract duct 7 extending under the working surface 5 to the atmosphere reconstituting unit 4. 115

An atmosphere curtain provided in front of the cabinet in accordance with the invention is produced from the top of the front of the chamber 1 and is arranged so that an inward volume of the curtain atmosphere
120 passes into the extract duct 7 with the atmosphere being withdrawn from the chamber.

The cabinet 1 has a false ceiling which forms a pressure chamber 8 supplied by a
125 conduit 9 connected to the atmosphere reconstituting unit 4. The conduit 9 is connected to the chamber 8 by a distributive resistance slot 10 so that uniform pressure

is maintained in the chamber 8. Atmosphere is discharged from the chamber 8 to form the curtain through an atmosphere inlet shown as a slot 11 in a curtain header 12, and there is uniform distribution of the atmosphere along the length of the slot 11. The curtain header 12 is rotatably mounted in rubber sealing members 13 in an aperture in the floor of the chamber 8 extending along the front of the cabinet.

A roller night curtain 14 for excluding dust from the chamber when the atmosphere curtain is not in operation, and a strip light 15 for illuminating the interior of the chamber, are disposed in the vicinity of the pressure chamber 8.

If it is desired to supply curtain atmosphere from an inlet at one side of the cabinet a curtain header duct as shown in Figures 2 and 3 is used to obtain uniform pressure distribution along the front of the cabinet. The header duct 16 tapers away from the supply end 17 and has a longitudinal slot 18 in which are mounted flow straightening vanes 19 so that the curtain atmosphere is discharged at right angles to the length of the slot 18.

When carrying out operations in the cabinet there is continual withdrawal through the extract grill 6 of atmosphere admitted into the chamber 1 through the diffusing wall 2. The atmosphere withdrawn is filtered in the atmosphere reconstituting unit 4 and the resulting reconstituted atmosphere is returned through the supply duct 3 to give a back-to-front flow which is substantially uniform throughout the chamber.

This back-to-front flow of atmosphere would itself provide a considerable degree of protection against the penetration of dust into the chamber, but the conditioned atmosphere would be wasted when it left the chamber. The principal protection against the entry of dust carried by draughts outside the chamber is the atmosphere curtain. This atmosphere curtain also directs the out-flow of the atmosphere in the chamber to the extract grill, and is maintained at a velocity and thickness to permit an operator's arms to be extended through the open front side of the chamber without allowing either exit of atmosphere otherwise than in the region of the extract grill or creating inwardly directed streams of curtain atmosphere.

The atmosphere curtain entrains contaminated air from outside the chamber after only a short path of travel, and also becomes mixed with atmosphere flowing to the open side of the chamber. The extracted atmosphere is thus contaminated with some of the air from outside the chamber. Also spillage which goes to waste in front of the extract grill 6 includes some of the atmosphere of the chamber. The curtain header 12 is

conveniently positioned so that the atmosphere curtain is directed at a small forward angle to the vertical as indicated in Figure 1, at which position the major part of the curtain volume passes into the extract duct 7.

Experimental determinations have shown that by balancing the quantity of atmosphere admitted through the back of the chamber, the quantity of atmosphere extracted at the front of the chamber and the atmosphere curtain supply it is possible to obtain the desired atmosphere in the chamber with considerable economy in the application of the air treatment unit, this being because 75—80% of the atmosphere introduced through the diffusing wall 2 is recirculated, and filter capacity and heating, cooling or humidifying capacity effected by the atmosphere reconstituting unit 4 is only that required to clean the 25—20% of contaminated air entrained by the curtain.

It has been found possible to obtain virtually complete protection against the penetration of airborne dust into the chamber, at least 98% efficiency in this respect being attainable.

Thus the invention allows the maintenance of an atmosphere having predetermining characteristics in a chamber without imposing on an operator the need to manipulate components and assemblies through a restricted access space.

A further embodiment of the invention is illustrated in Figure 4 of the drawings which shows a cabinet including a chamber 1 with two opposite sides open. Atmosphere is admitted into the chamber through a V-section duct 20 of diffusing material, for example fibre-glass, fixed to the top of the chamber between the open sides.

The shape of the duct 20 is such that it creates two oppositely circulating volumes of atmosphere each moving, as indicated by the arrows, towards an open side of the chamber 1.

The duct 20 communicates with a supply conduit 9 which runs along the top of the cabinet and is connected to the atmosphere reconstituting unit, not shown, and the conduit 9 also feeds pressure chambers 8, one for each open side, through distributive resistance slots 10. Each of the pressure chambers 8 discharges atmosphere through an atmosphere inlet of the same kind as illustrated in Figure 1 so that an atmosphere curtain is formed across each open side of the chamber 1.

An extract grill 6 is provided at the front of each open side and the extract ducts 7 for the two sides are connected together by a common duct 21 which is connected to the atmosphere reconstituting unit.

In another embodiment of the invention the chamber 1 is divided into two parts by a

- centrally disposed diffusing partition connected to the atmosphere reconstituting means and through which atmosphere is admitted to both parts of the chamber, there being
5 an aperture and co-operating flap in the partition to allow articles to be passed from an operator working through one of the open sides to an operator working through the other open side.
- 10 A number of single-sided or double-sided cabinets can if desired be constructed in unit lengths which can be coupled together to give either continuous work benches or individual assembly tables. The supplied
15 atmosphere may be fed by a group plant serving a number of cabinets or from individual units integral with each cabinet. Where the individual assembly tables are separated by intermediate walls, each of
these walls may have an aperture for the
20 passage of a conveyor through the units, and a flap for the aperture to permit a load on the conveyor to pass from one chamber to the next.
- It will be understood that in certain
25 circumstances certain atmosphere may be supplied from a different source and not from the atmosphere reconstituting unit 4. For example when handling a very light
30 commodity such as a powder it is advantageous to have a low rate of flow through the diffusing wall 2 while maintaining the atmosphere curtain supply already described.
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